

Climate Summary and Outlook For Colorado For April-May-June 2013

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National Weather Service, Boulder, Colorado - BOU

March 26, 2013

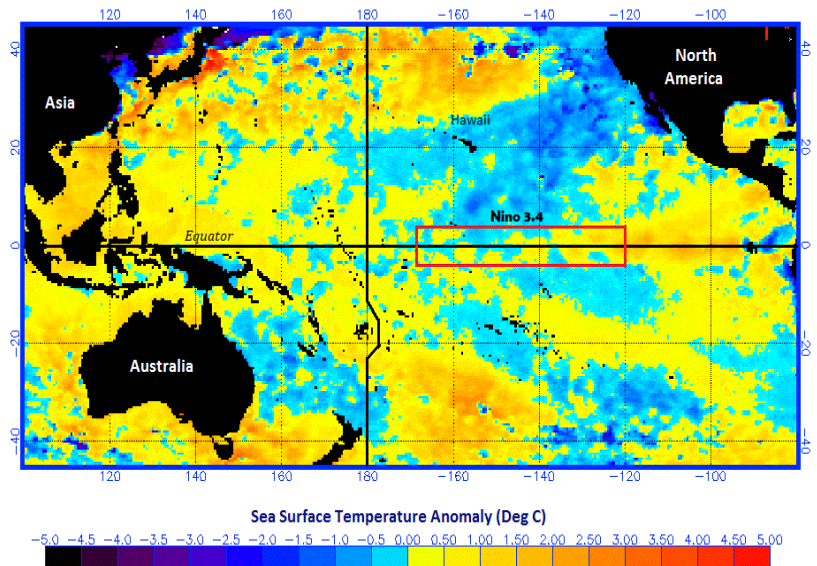
National Oceanic and Atmospheric Administration



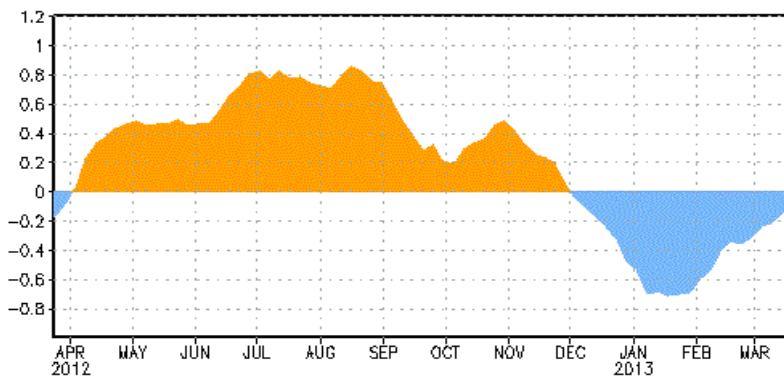
Pacific Ocean Sea Surface Temperatures As of Mid-March 2013

ENSO-neutral conditions continue in the tropical Pacific Ocean even though equatorial sea surface temperatures (SST) anomalies east of the International Date Line have trended warmer in recent weeks (see lower diagram).

NOAA/NESDIS Sea Surface Temperature Anomaly For March 25, 2013

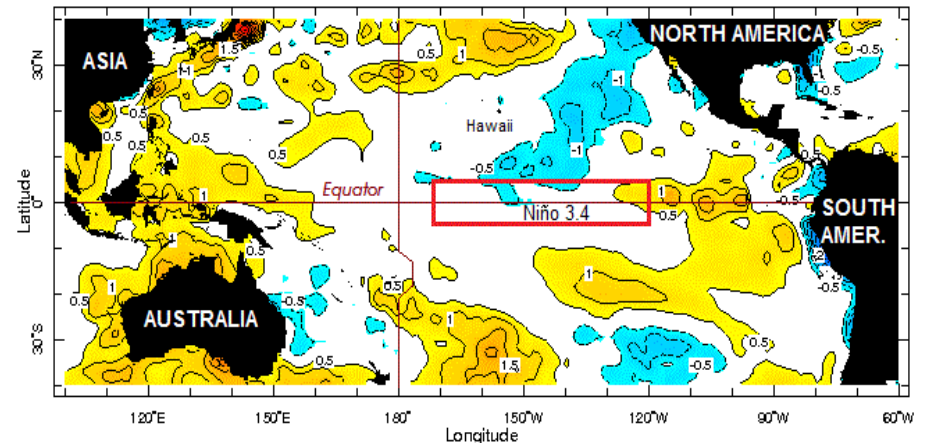


Upper-Ocean Heat Anomalies (deg C) for the
Eastern Equatorial Pacific Ocean
(180° -100° W Longitude)



Source: Climate Prediction Center, NOAA

Weekly Sea Surface Temperature Anomaly (deg C) Across the Pacific Ocean Basin
The Week of 17-23, 2013



Data Source: National Center for Environmental Prediction (NCEP), Environmental Monitoring Center
Map Source: International Research Institute for Climate and Society (IRI)

Niño Region SST Departures From Normal (in Deg C) for Mid-March 2013

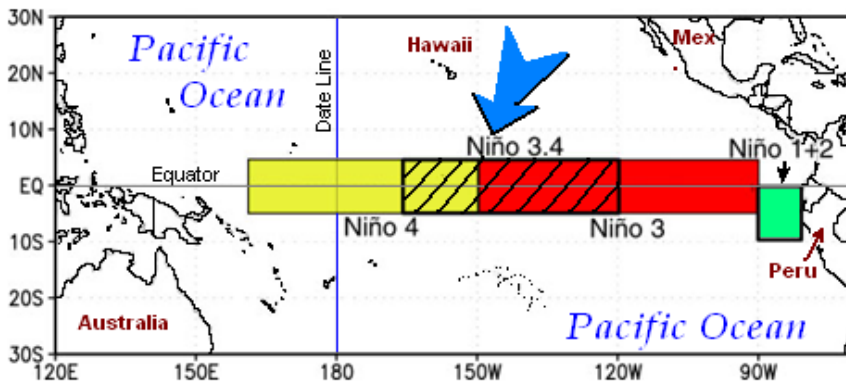
The latest weekly SST departures are:

Niño 4 -0.2 C

Niño 3.4 -0.1 C

Niño 3 0.4 C

Niño 1+2 0.2 C



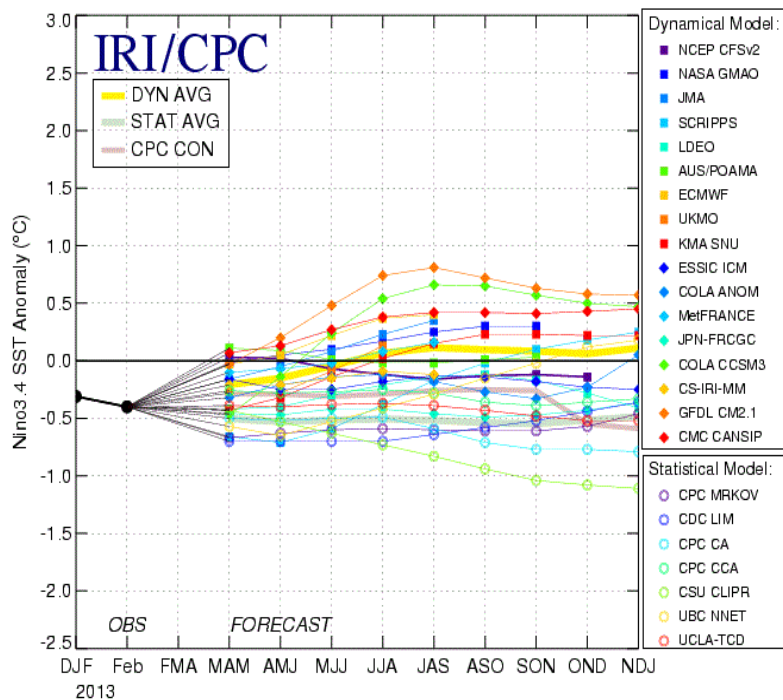
SST Anomalies for the Eastern Equatorial
Pacific Region of Niño 3.4



Source: Climate Prediction Center, NOAA

Oceanic and atmospheric conditions within the eastern tropical Pacific Ocean region Niño 3.4 are used by NOAA's Climate Prediction Center (CPC) to monitor, assess and predict the El Niño/ Southern Oscillation (ENSO). The SST anomaly for Niño 3.4 for the week centered on March 20, 2013 was -0.1 c. SST anomalies farther east (Niño 3) were warmer and also positive in value.

Mid-Mar 2013 Plume of Model ENSO Predictions



ENSO Model Predictions

A majority of ENSO dynamical and statistical model forecasts of Niño 3.4 SST anomalies are clustered around 0°C (-0.45°C to 0.45°C) through at least the summer of 2013. This is an indication of ENSO-neutral conditions in the equatorial Pacific Ocean.

2013-2014 Seasons

Dynamical models

NCEP CFSv2
NASA GMAO model
Japan Met. Agency model
Scripps Inst. HCM
Lamont-Doherty model
POAMA (Austr) model
ECMWF model
UKMO model
KMA (Korea) SNU model
ESSIC Intermed. Coupled model
COLA ANOM
MÉTÉO FRANCE model
Japan Frontier Coupled model
COLA CCSM3 model
CSIR-IRI 3-model MME
GFDL CM2.1 Coupled Climate model
Canadian Coupled Fcst Sys
Average, dynamical models

Statistical models

NCEP/CPC Markov model
NOAA/CDC Linear Inverse
NCEP/CPC Constructed Analog
NCEP/CPC Can Cor Anal
Landsea/Knaiff CLIPER
Univ. BC Neural Network
TDC - UCLA
Average, statistical models
Average, all models

MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
0	0	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	
0	0.1	0.1	0.2	0.3	0.3	0.3		
-0.2	-0.1	0.1	0.2	0.4				
-0.7	-0.7	-0.6	-0.4	-0.2	0	0.1	0.2	0.3
-0.4	-0.4	-0.3	-0.2	-0.1	-0.1	-0.2	-0.3	-0.4
0.1	0.1	0	0	0	0	0		
0	0.1	0.2	0.4	0.4				
-0.3	-0.3	-0.1	0.1					
-0.4	-0.3	-0.1	0	0.2	0.2	0.2	0.2	0.2
-0.2	-0.3	-0.3	-0.2	-0.1	-0.1	-0.2	-0.2	-0.3
-0.3	-0.2	-0.1	-0.1	-0.2	-0.3	-0.3	-0.2	0.1
-0.1	-0.1	0	0.1	0.2				
-0.5	-0.5	-0.4	-0.4	-0.5	-0.5	-0.5	-0.4	-0.4
-0.5	-0.1	0.2	0.5	0.7	0.7	0.6	0.5	0.5
-0.2	-0.2	-0.2	-0.1	-0.1				
0	0.2	0.5	0.7	0.8	0.7	0.6	0.6	0.6
0.1	0.1	0.3	0.4	0.4	0.4	0.4	0.4	0.5
-0.2	-0.2	0	0.1	0.1	0.1	0.1	0.1	0.1

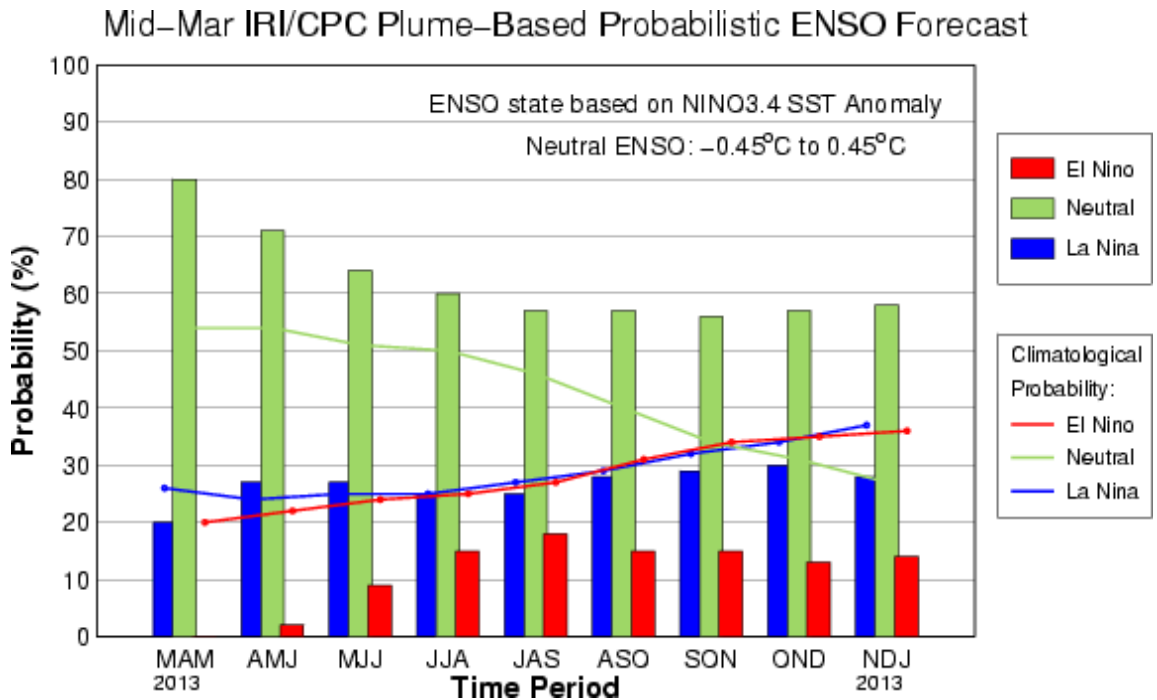
-0.7	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.5
-0.7	-0.7	-0.7	-0.7	-0.6	-0.6	-0.5	-0.4	-0.4
-0.5	-0.5	-0.5	-0.5	-0.6	-0.7	-0.8	-0.8	-0.8
-0.3	-0.3	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.3
-0.4	-0.5	-0.6	-0.7	-0.8	-0.9	-1	-1.1	-1.1
-0.6	-0.7	-0.5	-0.4	-0.3	-0.2	0	0.1	0.2
-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.5	-0.5	-0.5
-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
-0.3	-0.3	-0.2	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2

Source: International Research Institute for Climate and Society (IRI)

ENSO Model Probabilities as of Mid-March 2013

There is a 64 to 80 percent probability of ENSO-neutral conditions this spring and about a 55 to 60 percent chance of neutral conditions during the summer of 2013.

Models also indicate a gradual increase in the chance of a La Niña this fall.



IRI Probabilistic ENSO Prediction for NINO3.4 Region

Season	La Niña	Neutral	El Niño
MAM 2013	20%	80%	~0%
AMJ 2013	27%	71%	2%
MJJ 2013	27%	64%	9%
JJA 2013	25%	60%	15%
JAS 2013	25%	57%	18%
ASO 2013	28%	57%	15%
SON 2013	29%	56%	15%
OND 2013	30%	57%	13%
NDJ 2014	28%	58%	14%

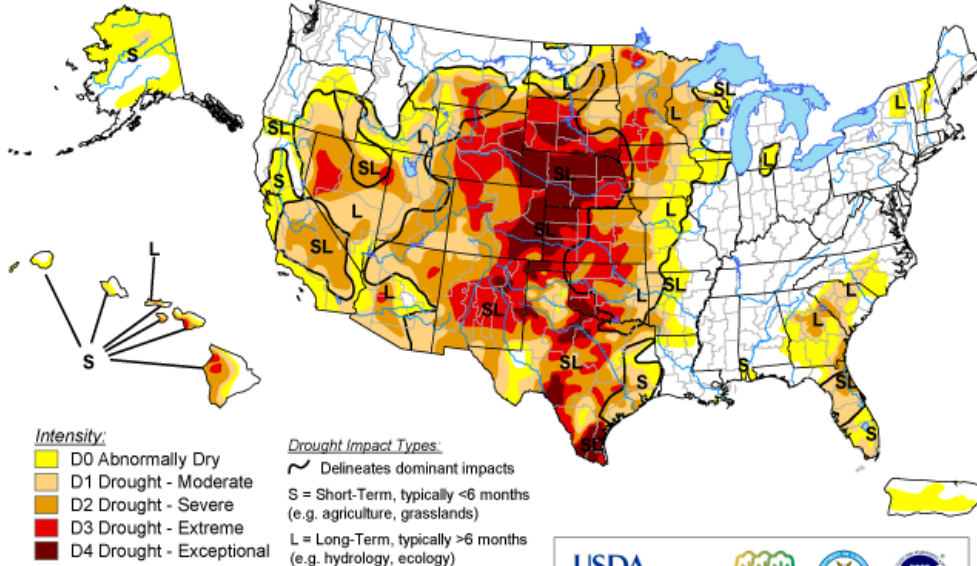
Source: International Research Institute for Climate and Society (IRI)

Current Drought Conditions

The most recent U.S. Drought Monitor indicates a broad area of extreme to exceptional drought conditions across the central United States. States hardest hit by drought conditions at this time include South Dakota, Wyoming, Nebraska, Colorado, Kansas, New Mexico, Oklahoma and Texas. In Colorado, exceptional drought conditions persist in east central and southeast parts of the state. Although some improvement has occurred in Colorado the past few weeks due to recent precipitation.

U.S. Drought Monitor

March 19, 2013
Valid 7 a.m. EDT



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu/>



Released Thursday, March 21, 2013
Author: Anthony Artusa, NOAA/NWS/NCEP/CPC

U.S. Drought Monitor

March 19, 2013
Valid 7 a.m. EST

Colorado

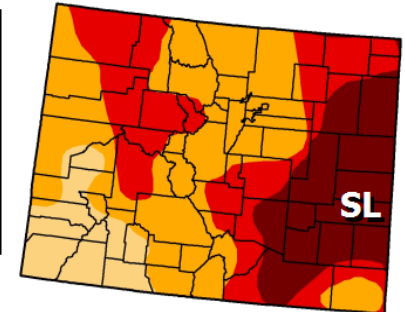
	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	88.97	48.06	21.22
Last Week (03/12/2013 map)	0.00	100.00	100.00	88.97	48.06	21.22
3 Months Ago (12/18/2012 map)	0.00	100.00	100.00	95.06	53.47	13.48
Start of Calendar Year (01/01/2013 map)	0.00	100.00	100.00	95.06	53.47	13.48
Start of Water Year (09/25/2012 map)	0.00	100.00	100.00	100.00	61.75	16.89
One Year Ago (03/13/2012 map)	28.97	71.03	42.60	8.30	0.21	0.00

Intensity:



Drought Impact Types:

~ Delineates dominant impacts
S = Short-Term, typically <6 months (e.g. agriculture, grasslands)
L = Long-Term, typically >6 months (e.g. hydrology, ecology)



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

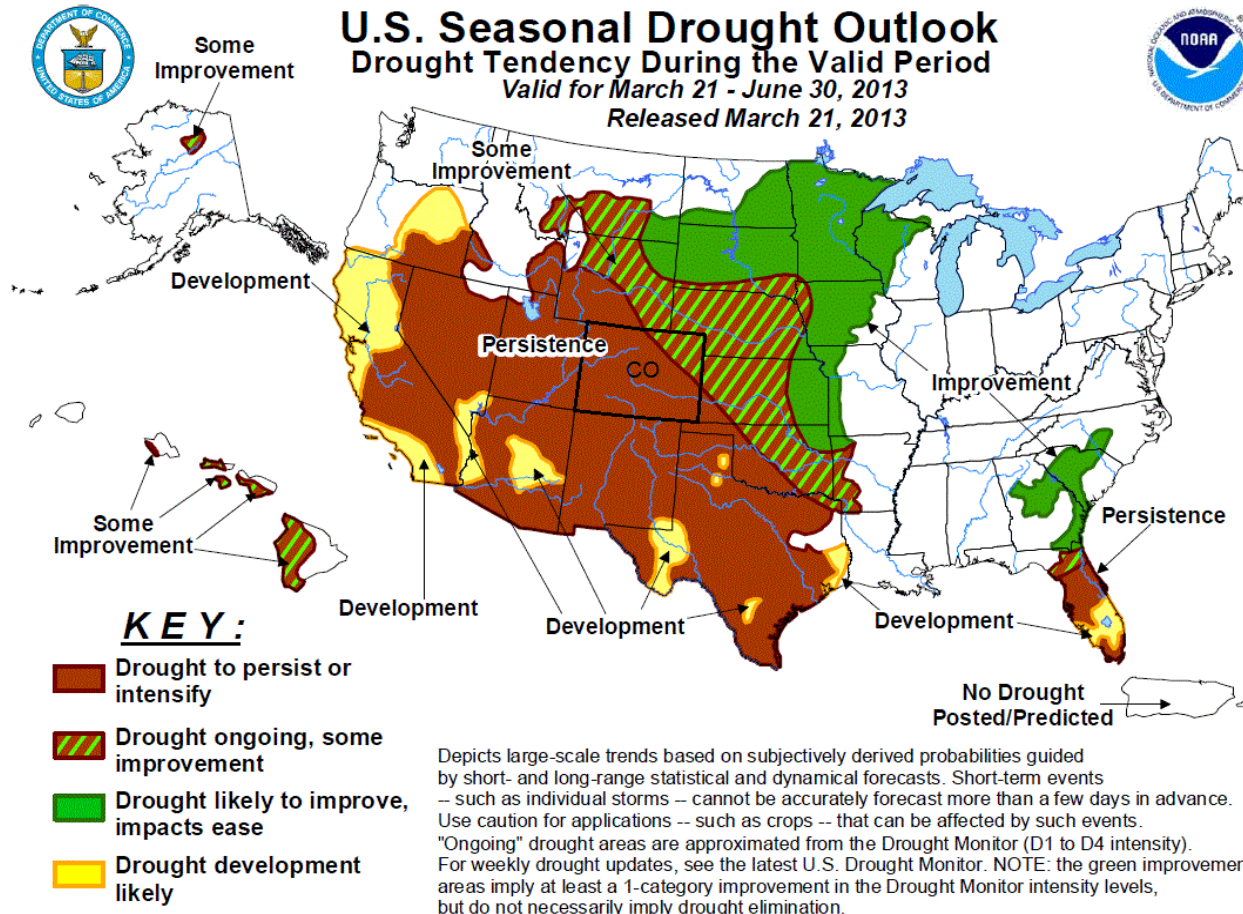
<http://droughtmonitor.unl.edu>



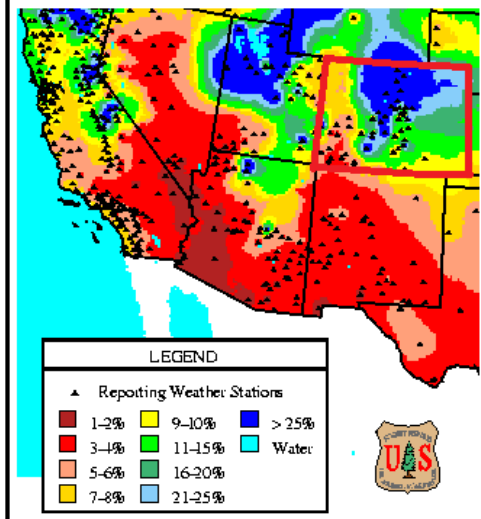
Released Thursday, March 21, 2013
National Drought Mitigation Center,

Seasonal Drought Outlook For March 21-June 30, 2013

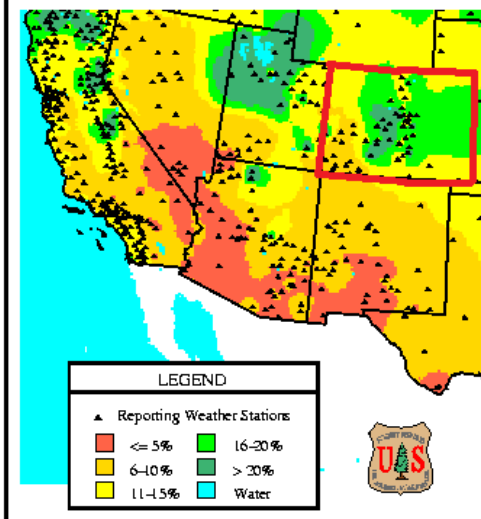
The latest Seasonal Drought Outlook indicates some improvement in drought conditions for the northern Rocky Mountains and central Great Plains, including northeast Colorado. The outlook is also calling for likely improvement in the drought for the northern Great Plains, the Upper Mississippi River Valley, the coastal and piedmont regions of Georgia and the Carolinas and Hawaii. Otherwise, drought is expected to persist across southwest and south central portions of the U.S. including most of Colorado, and the Florida panhandle.



Observed or Computed 10-Hour
Fuel Moisture for Southwest U.S.
as of March 25, 2013



Observed or Computed 100-Hour
Fuel Moisture for Southwest U.S.
as of March 25, 2013



(Inv. Dist.⁷ Interp.)

WFAS-MAPS Graphics FIRE BEHAVIOR RESEARCH MISSOULA, MT

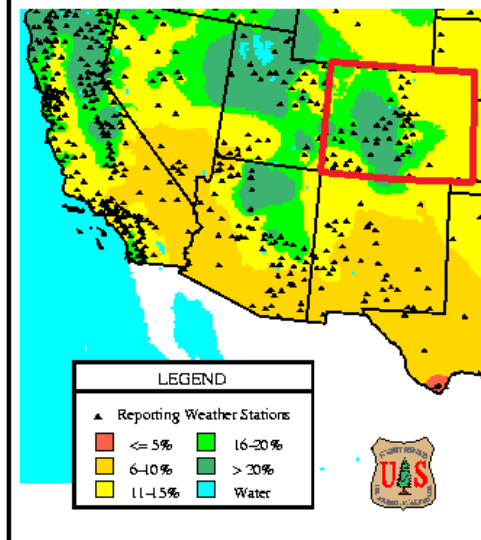
Improving Fuel Moistures Across Colorado in Recent Weeks

The moisture content of dead fuel particles (grasses, shrubs, trees, etc.) is among the most important fuel characteristics affecting fire behavior. Basically, the greater the moisture content, the greater the absorption of heat released during combustion, and therefore the greater its influence on fire behavior.

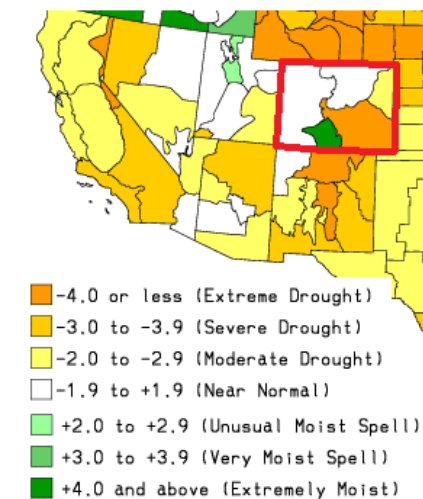
Fuel moistures across much of Colorado have improved in recent weeks due to a number of beneficial snow storms. As of March 25, 2013, the greatest 10-hour fuel moistures (fuels of ¼ to 1 inch in diameter) were observed or computed in north central and northeast Colorado. The Four Corners area of Colorado had the lowest 10-hour fuel moistures (3 to 4 percent moisture content by volume).

Fuel moistures for 100-hour (1 to 3 inch diameter) and 1000-hour (3 to 8 inch diameter) fuels were nearly as great in central and eastern Colorado, and in western Colorado, respectively. The Drought Severity Index for the same time was near normal, except in south central and southeast Colorado. (See the map at left.)

Observed or Computed 1000-Hour
Fuel Moisture for Southwest U.S.
as of March 25, 2013

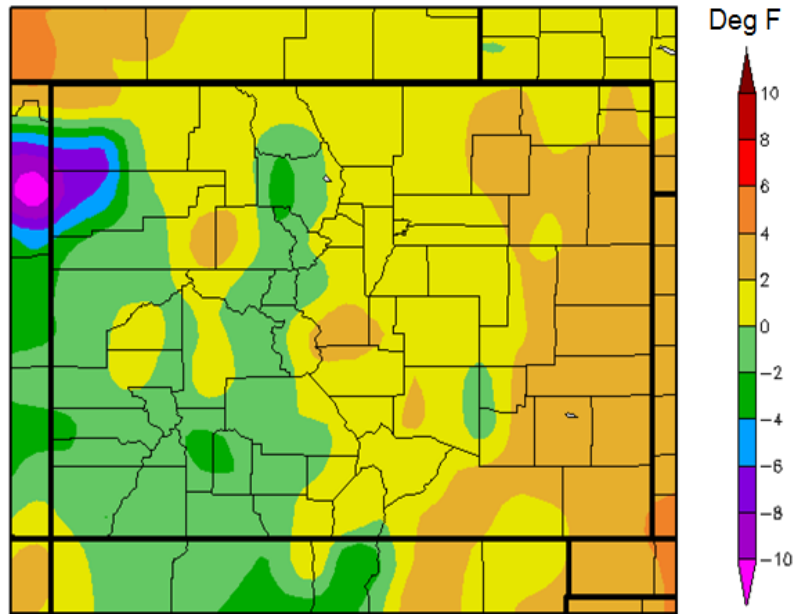


Drought Severity Index by Division
Weekly Value for Period Ending Mar 23, 2013
(Long Term Palmer Drought Index)



Source: Climate Prediction Center, NOAA

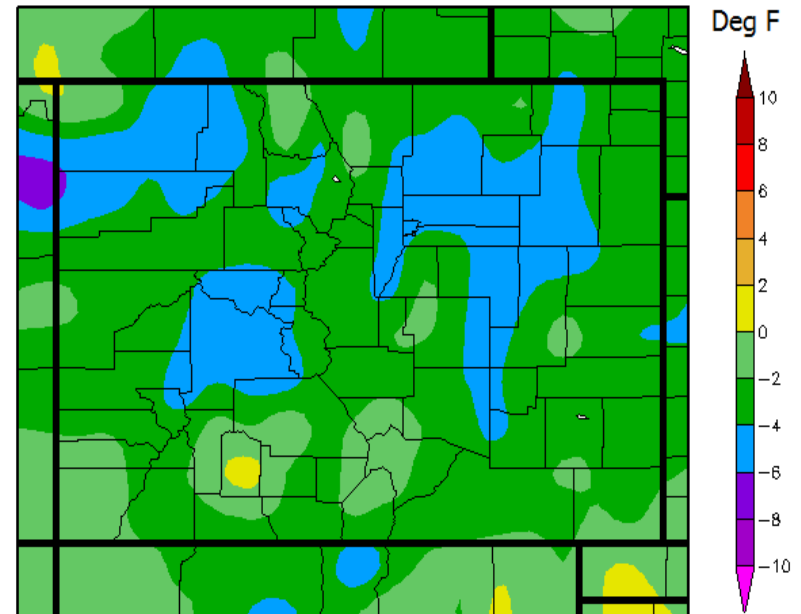
30 Day Departure from Normal
Temperature (F)
January 24 to February 22, 2013



Generated 2/23/2013 at HPRCC using provisional data.

Regional Climate Centers

30 Day Departure from Normal
Temperature (F)
Feb 24 to Mar 25, 2013

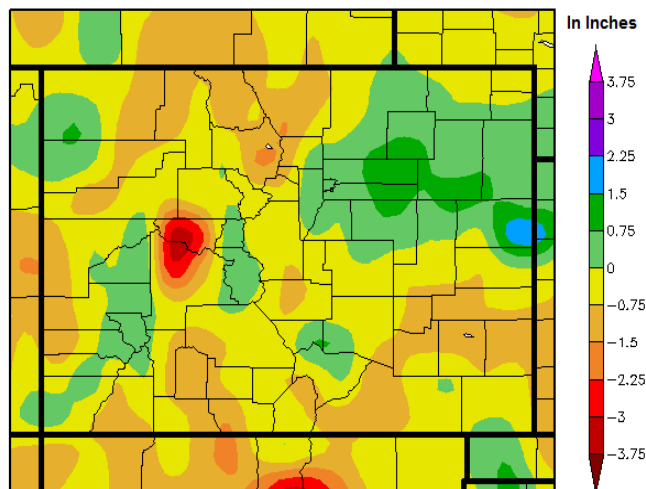


Generated 3/26/13 at the High Plains Regional Climate Center using Provisional Data

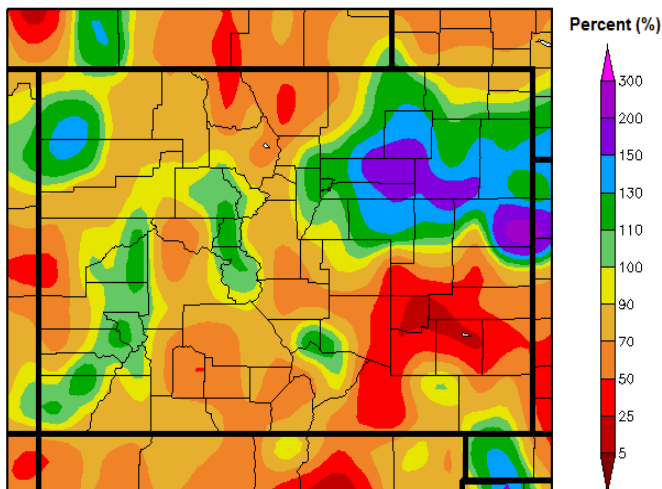
Recent Temperatures In Colorado

Temperatures in Colorado made a dramatic shift to colder during the 30 day period ending March 25, 2013. After a warmer than average January and early February, particularly in areas east of the Continental Divide, temperature departures turned negative for nearly the entire state. The greatest negative anomalies (blue shading) were observed in northwest, northeast and west central Colorado. A significant shift in the dominant jet stream pattern (storm track) over the western United States during March was probably largely to blame for the reversal in temperature.

90 Day Departure from Normal
Precipitation
Dec 26 2012 to Mar 25, 2013



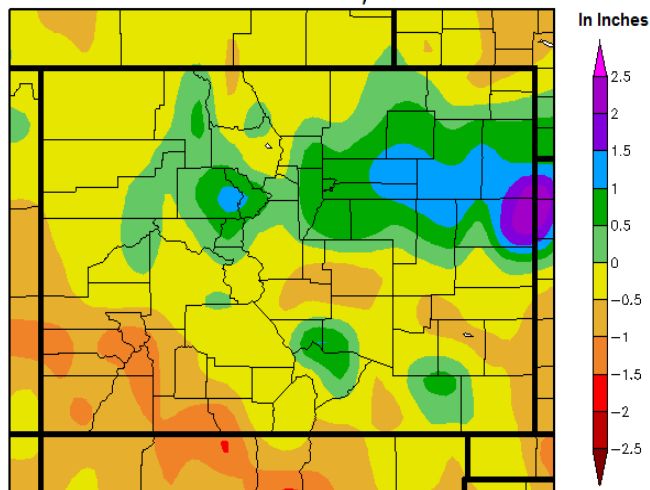
90 Day Percent of Normal
Precipitation
Dec 26 2012 to Mar 25, 2013



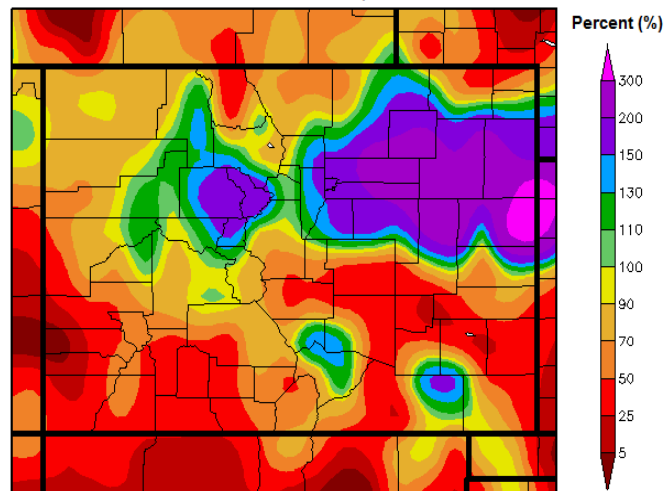
Recent Precipitation In Colorado

The upper two maps show the departure from normal and the percent from normal precipitation during the 90 day period ending March 25, 2013. Most notable was the amount and percent above normal precipitation across northeast Colorado. In contrast, portions of north central and southeast Colorado were abnormally dry during the 90 day period.

30 Day Departure from Normal
Precipitation
Feb 24 to Mar 25, 2013



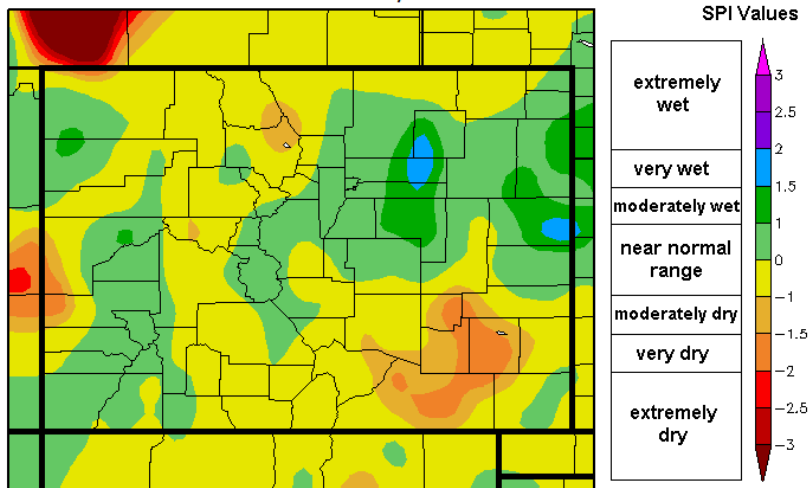
30 Day Percent of Normal
Precipitation
Feb 24 to Mar 25, 2013



During the latest 30 day period ending March 25, 2013, the wide distribution in precipitation was even more pronounced. Three significant snowfalls during March in north central and northeast Colorado pushed precipitation totals for the 30 day period over 150 percent of normal.

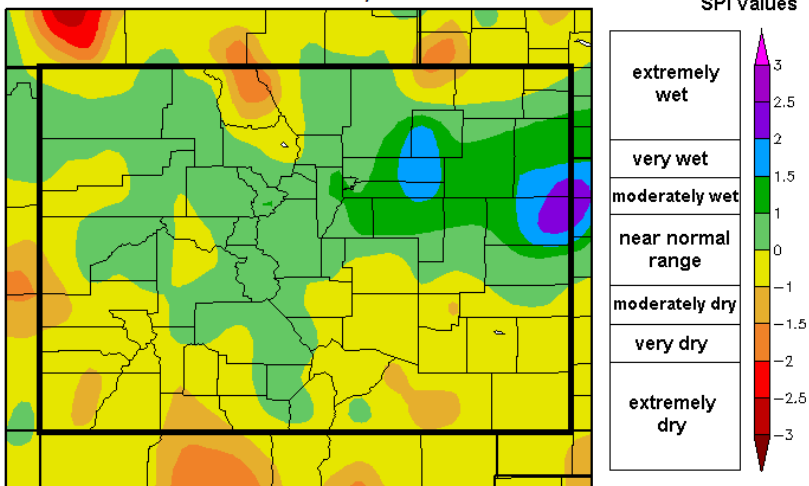
90 Day Standardized Precipitation Index (SPI)

Dec 26 to Mar 25, 2013



30 Day Standardized Precipitation Index (SPI)

Feb 24 to Mar 25, 2013



Generated 3/26/13 at the High Plains Regional Climate Center using Provisional Data

Recent Soil Moistures In Colorado

During the 30 and 90 day periods ending March 25, 2013, soil moisture levels in Colorado, according to the standardized precipitation index (SPI), were generally greatest across the northern half of the state, with the wettest soils found on the plains of northeast Colorado.

The driest soils continued to plague the plains of southeast Colorado, the upper Laramie River Basin in north central Colorado, and the lower reaches of the Colorado River Basin in west central Colorado.

The wet to very wet soil conditions observed in northeast Colorado were undoubtedly the result of a series of winter-like storm systems that each deposited several inches of snow containing a high snow-water equivalent. These moist conditions are not all that uncommon for this time of year as March and April climatologically are the two snowiest months of the year for this part of the Centennial State.

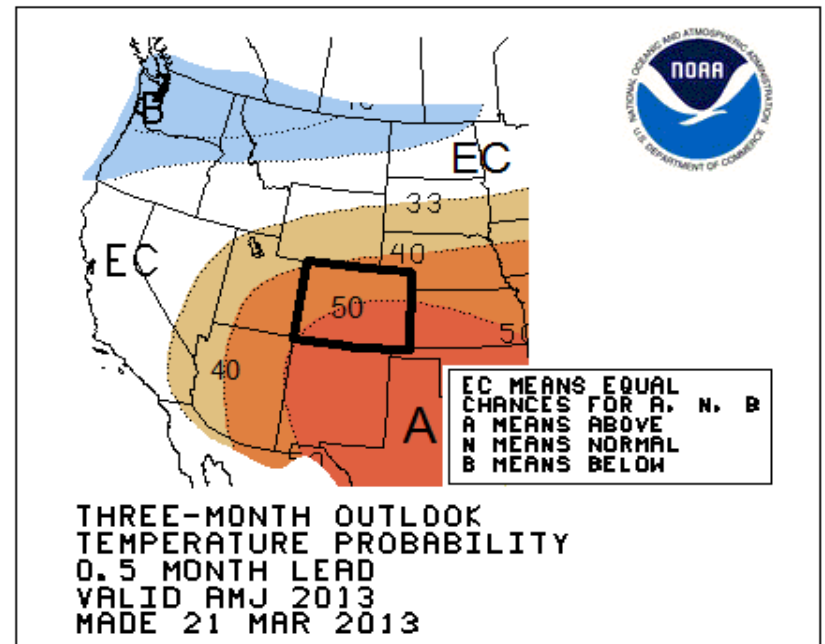
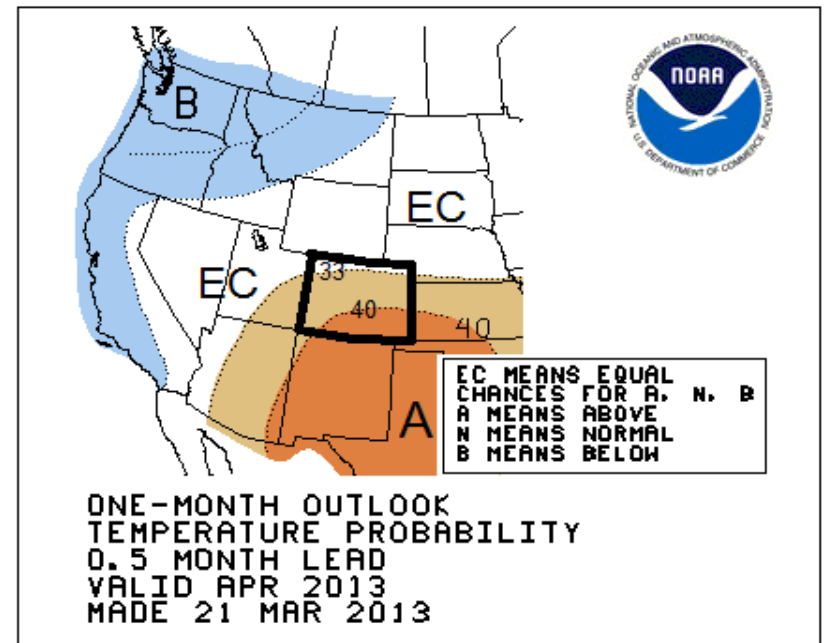
The SPI was developed to monitor potential short term agricultural and long-term hydrological drought conditions. The SPI is a probability index that considers only precipitation.

One and Three Month Temperature Outlooks For Colorado and the Western United States

For the month of April and the three month period of April-June, NOAA's Climate Prediction Center (CPC) is calling for at least a 33.3 percent chance of above (A) average temperature (orange shading) across the Four Corners and lower Great Basin regions, much of the Desert Southwest, the central and southern Rocky Mountain region including Colorado, and the southern half of Great Plains where there is at least a 40 percent chance for warmer than average temperatures.

The outlook also calls for at least a 33.3 percent chance of below (B) average temperature (blue shading) for areas along the west coast of the U.S. during April, and similar odds for colder than average temperature from the Pacific Northeast eastward across the far northern Great Plains during the climate season April-June.

Elsewhere, there is an equal or undeterminable chance (designated by the symbol EC) for above, below and near average temperature during the two outlook periods.

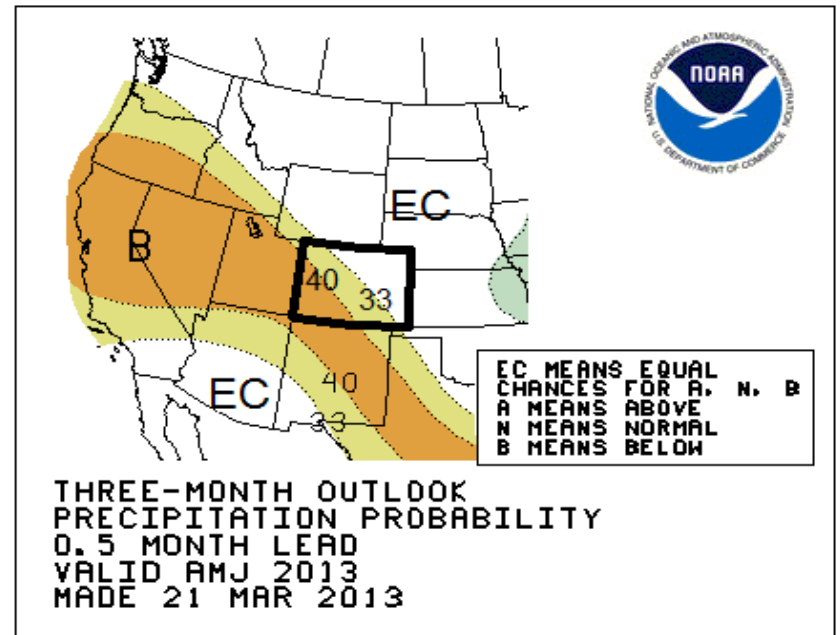
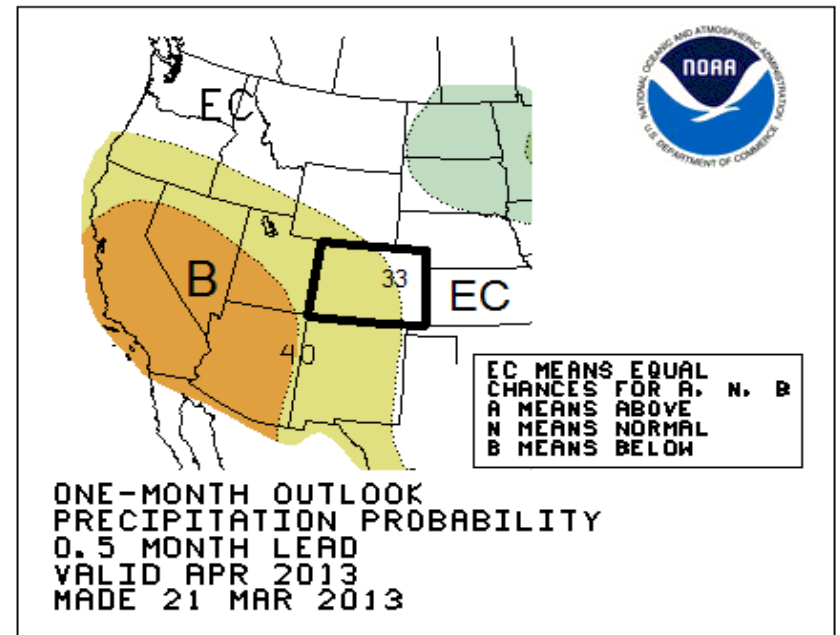


One and Three Month Precipitation Outlooks For Colorado and the Western United States

For the month of April, NOAA's Climate Prediction Center (CPC) is calling for at least a 33.3 percent chance of below (B) average precipitation (orange shading) across the southwest U.S., including most of Colorado, with at least a 40 percent chance for below average precipitation the southern two-thirds of California, the lower Great Basin, and nearly all of Arizona. The outlook for the period April-June calls for a similar chance for below average precipitation in a large area stretching from the central West Coast to Texas, including the southwest half of Colorado.

The outlook also calls for at least a 33.3 percent chance of above (A) average precipitation (green shading) for the northern Great Plains during April, and the central Great Plains during the period April-June.

Elsewhere, there is an equal or undeterminable chance (designated by the symbol EC) for above, below and near average precipitation during the two outlook periods.



NOAA, Climate Prediction Center

Baker – National Weather Service Boulder, Colorado

The following links show some of the ENSO composites that were used to make these forecasts.

CPC ENSO Box & Whisker Analysis:

http://www.cpc.ncep.noaa.gov/products/precip/CWlink/ENSO/box_whiskers/index.php

El Nino and La Niña-Related Winter Features over North America:

http://www.cpc.ncep.noaa.gov/products/precip/CWlink/ENSO/composites/EC_LNT_index.shtml

Winter Composites:

http://www.cpc.noaa.gov/products/analysis_monitoring/ensocycle/nawinter.shtml

El Nino – Southern Oscillation (ENSO) Indicators:

<http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml>